U. S. Department of Commerce • Charles Sawyer, Secretary
National Bureau of Standards • A. V. Astin, Director

JOURNAL OF RESEARCH

of the

NATIONAL BUREAU OF STANDARDS

Volume 48—January to June 1952

Research Papers 2279 to 2335

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C.

ENGIN. LIBRARY
TA
1
.U.58

Corrections to be noted in volume 48 of the Journal of Research of the National Bureau of Standards

Page	Column	Line	Now reads in part	Should read
51	2	last	x_n	x_m
52	1	28	(6) $W[\rho^{-1}f(X, Y)]$	$W[\rho^{-1}f(X, Y)]$.
52	2	14	$(\varphi_{t_i}X)$	$\phi_{t_i}(X)$
112	2	last	$x^{2^n+2^p}$	$x^{2^m+2^p}$
112	2	eq 15a	$\pi'_{i=1}^{n}$	$\Pi'_{i=1}^{n}$
112	2	22	π'	Π'
112	2	15b	$\pi_{i=1}^{n}$	$\Pi_{i=1}^{n}$
113	1	6 and 7	$e^{x_i^{(n)}/4}$	$e^{X_i^{(n)}/4}$
113	2	1	I_0	$I_0(1/8)$
129	1	24	efforts	effects
136	2	eq 29	$1+\left(\frac{q^2}{2}\right)$	$\left(1+\frac{q^2}{2}\right)$
137	1	eq 3	θ_{ac}	θ_{dc}
145	2	5 and 7	$e^{O(n^{-1})}$	$e^{O(n^{-1})}$
186	1	14	table 2	table 3
197	1	32	low	room
260	1	2	$-\infty \leq x \leq \infty$,	$-\infty < x < \infty$,
260	1	3	standard	standardized
263	2	9 from bottom	$e-x^2/2$,	$e^{-x^2/2}$,
266	2	5	$k, m>0$	$k, m>0$ and involve a, b, c.
271	2	2 of legend	$\frac{1}{2}$a	$\frac{1}{2}\mu$a
272	1	31	P	J
290	2	4	[3]	[4]
347	1	15	$x=0$	$x>0$
370	2	15	tin-	thin-
394	1	2	572.3	4572.3
394	2	1	band	and
442	1	6	centroid of mean	centroid, or mean
443	Table 1	last	$\times$	—
445	GWH, table 3	12	11	10
445	IN, table 3	12	10	11
447	2	eq 16, 17	$-\alpha$	$-a$ [in all cases]

The Research Papers listed herein may be purchased from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at the prices indicated, beginning on page IV, or at a discount of 25 percent for 100 copies or more. Remittance should be in the form of a post-office money order, coupons (issued by the Superintendent of Documents for the specific purpose of purchasing Government publications), express money order, New York draft, or cash at sender's risk. Postage is not required in the United States, to U. S. possessions, and to countries extending franking privileges. For mailing to other countries, an additional amount of about one-third of the purchase price is required. Remittances from foreign countries should be by international money order payable to the Superintendent of Documents, or by draft on an American bank. Prices of bound volumes are listed on page III, and for shipment to other countries requiring postage, add 50 cents to the cost of the volume.

RESEARCH PUBLICATIONS

of the

NATIONAL BUREAU OF STANDARDS

1904–1919:

(*a*) *Bulletin of the Bureau of Standards.* A quarterly journal. The *Bulletin* contained all research papers until, in 1910, it was limited to scientific papers; see (*f*) for technical papers.

(*b*) *Reprints* [1] from (*a*), *Scientific Papers* S1 to S329.

(*c*) Volumes [1] (*a*) cloth-bound, consecutively paged and indexed. Volumes 1 to 14.

1919–1928:

(*d*) *Scientific Papers* [1] *of the Bureau of Standards* (separates continuing series (*b*), Nos. S330 to S572).

(*e*) Volumes [1] of (*d*), cloth-bound, consecutively paged and indexed. Volumes 15 to 22.

1910–1928:

(*f*) *Technologic Papers* [1] *of the Bureau of Standards*, T1 to T370. Prior to T203 issued only as separates.

(*g*) Volumes [1] of (*f*), cloth-bound, beginning with T203, volumes 16 to 22; consecutively paged and indexed.

1928:

(*h*) *Bureau of Standards Journal of Research.* Monthly, continuing and consolidating (*d*) and (*f*).

1934:

(*i*) *Journal of Research of the National Bureau of Standards.* New title of (*h*), beginning with volume 13 (July 1934).

(*j*) Volumes [2] of (*h*) and (*i*), cloth-bound (six monthly issues), consecutively paged and indexed.

(*k*) Separates of (*h*) and (*i*), issued under series title, *Research Papers.*

Circular 460 contains a list of (a) to (g), inclusive, from 1901 to June 30, 1947, with subject and author indexes. Abstracts are included only for publications issued during the period January 1, 1942, to June 30, 1947. Circular C24 and Supplements are available for those desiring abstracts for all publications for the period 1901 to June 30, 1944.

Copies of these Circulars and Supplements may be consulted at public and technical libraries, and are also obtainable by purchase from the Superintendent of Documents, Government Printing Office. Washington 25, D. C., at the following prices:

Circular 460 (1901 to June 30, 1947), with subject and author indexes, and abstracts for January 1, 1942, to June 30, 1947	$1.00
Circular C24, 7th edition (1901 to June 30, 1925)	.45
1925–1931 Supplement to C24 (July 1, 1925, to Dec. 31, 1931)	.40
1932–1941 Supplement to C24 (Jan. 1, 1932, to Dec. 31, 1941, with subject and author indexes, 1901 to 1941)	.50
1941–1944 Supplement to C24 (Jan. 1, 1942, to June 30, 1944)	.20

[1] Out of print. For other information, see Circular 460.

[2] Volumes 20, 25, 27, 29, 35, 36, 37, $3.00 each; 38, $4.00; 39, $3.50; 40, $3.25; 41, 42, $3.75 each; 43, $4.00; 44, $4.25; 45, 46, $3.75 each. For shipments to foreign countries add 50 cents to the cost of the volume.

226845—52

CONTENTS OF VOLUME 48

Vol. 48—January—No. 1

RP		Page
2279	Absolute viscosity of water at 20° C. J. F. Swindells, J. R. Coe, Jr., and T. B. Godfrey....20 cents	1
2280	On some functionals of Laplacian processes. R. Fortet..10 cents	32
2281	Solubility of carbon in 18-percent-chromium–10-percent-nickel austenite. Samuel J. Rosenberg and Carolyn R. Irish...10 cents	40
2282	Uniformly best constant risk and minimax point estimates. Raymond P. Peterson....10 cents	49
2283	Sensitive mercury-level detecting unit for manometers. W. E. Williams, Jr....10 cents	54
2284	A note on bounds of multiple characteristic roots of a matrix. P. Stein....5 cents	59
2285	Binding energies for electrons of different types. Charlotte E. Moore and Henry Norris Russel....10 cents	61
2286	On the estimation of an eigenvalue by an additive functional of a stochastic process, with special reference to the Kac-Donsker methods. R. Fortet....10 cents	68
2287	Synthesis and physical properties of *n*-heptane and 2,2,4-trimethylpentane. Philip Pomerantz....10 cents	76
2288	Some general theorems on iterants. P. Stein....5 cents	82
2289	Ionization constant of 5,5′-diethylbarbituric acid from 0° to 60° C. George G. Manov, Kathryn E. Schuette, and Floyd S. Kirk. 10 cents	84
2290	Infrared absorption spectra of five halomethanes. Earle K. Plyler and Nicolo Acquista....10 cents	92

Vol. 48—February—No. 2

2291	Film-rupture mechanism of stress corrosion. Hugh L. Logan. 10 cents	99
2292	A note on the bounds of the real parts of the characteristic roots of a matrix. P. Stein....5 cents	106
2293	Chart for the TE_{11} mode piston attenuator. Charles M. Allred. 5 cents	109
2294	Table of the zeros and weight factors of the first twenty Hermite polynomials. Herbert E. Salzer, Ruth Zucker, and Ruth Capuano....10 cents	111
2295	Film dosimetry of electrons in the energy range 0.5 to 1.4 million electron volts. J. Fleeman and F. S. Frantz, Jr....5 cents	117
2296	Thermal converters as ac-dc transfer standards for current and voltage measurements at audio frequencies. Francis L. Hermach. 15 cents	121
2297	Some nonnegative trigonometric polynomials connected with a problem in probability. Eugene Lukacs and Otto Szász. 10 cents	139
2298	Measurement of cesium-137 and cobalt-60 gamma radiation with a pressure ionization chamber. G. R. Grove....10 cents	147
2299	Techniques for growing and mounting small single crystals of refractory compounds. Fred Ordway....10 cents	152
2300	Crystal forms of chromium orthophosphate. Barbara M. Sullivan and Howard F. McMurdie....5 cents	159

Vol. 48—March—No. 3

RP — Page

2301 Synthesis of D-glucose-1-C^{14} and D-mannose-1-C^{14}. H. S. Isbell, J. V. Karabinos, H. L. Frush, N. B. Holt, A. Schwebel, and T. T. Galkowski....10 cents 163

2302 Effects of maxima suppressors on polarographic diffusion currents. John Keenan Taylor and Roberta E. Smith....10 cents 172

2303 Heat capacity of gaseous carbon dioxide. Joseph F. Masi and Benjamin Petkof....10 cents 179

2304 Mass spectra of deuteroacetylenes, monodeuterobenzene, and deuteronaphthalenes. Fred L. Mohler, Vernon H. Dibeler, Laura Williamson, and Helen Dean....10 cents 188

2305 Influence of nitrogen on the notch toughness of heat-treated 0.3-percent-carbon steels at low temperatures. Glenn W. Geil, Nesbit L. Carwile, and Thomas G. Digges....10 cents 193

2306 Determination of metallic beryllium and beryllium carbide in beryllium metal. Walter A. Bergholz....10 cents 201

2307 Heats of combustion and formation of liquid ethylenimine. Raymond A. Nelson and Ralph S. Jessup....5 cents 206

2308 Thermal expansion of aluminum and some aluminum alloys. Peter Hidnert and H. S. Krider....10 cents 209

2309 Some accurately measured infrared wavelengths for calibration of grating spectrometers. Earle K. Plyler, Norman M. Gailar, and Thomas A. Wiggins....10 cents 221

2310 A method of summing infinite series. Samuel Lubkin..20 cents 228

2311 Properties of certain statistics involving the closest pair in a sample of three observations. Julius Lieblein....10 cents 255

Vol. 48—April—No. 4

2312 Pressure-humidity apparatus. Arnold Wexler and Raymond D. Daniels, Jr....10 cents 269

2313 Heats of copolymerization of butadiene and styrene from measurements of heats of combustion. Raymond A. Nelson, Ralph S. Jessup, and Donald E. Roberts....10 cents 275

2314 Infrared spectra of methanol, ethanol, and *n*-propanol. Earle K. Plyler....10 cents 281

2315 Pigmentation in bristle and horsehair. Sanford B. Newman 10 cents 287

2316 The system beryllia-aluminia-titania: Phase relations and general physical properties of three-component porcelains. S. M. Lang, C. L. Fillmore, and L. H. Maxwell....10 cents 298

2317 Effect of temperature on the tensile properties of high-purity nickel. William D. Jenkins and Thomas G. Digges....10 cents 313

2318 Thiophosphation of 2-methyl-2-nitro-1-propanol and the preparation of monothiophosphoric acid. J. V. Karabinos, R. A. Paulson, and W. H. Smith....5 cents 322

2319 Surface changes in an original and an activated bentonite. Juan de Dios Lopez-Gonzalez and Victor R. Deitz....10 cents 325

2320 Arc spectra of gallium, indium, and thallium. William F. Meggers and Robert J. Murphy....10 cents 334

2321 On the truncation error in the solution of Laplace's equation by finite differences. Wolfgang Wasow....5 cents 345

Vol. 48—May—No. 5

RP		Page
2322	Influence of temperature and moisture on the electrical properties of leather. Charles E. Weir.....10 cents	349
2323	Synthesis of mica. Alvin Van Valkenburg and Robert G. Pike.....10 cents	360
2324	pH response of nonhygroscopic glasses. Richard G. Goldman and Donald Hubbard.....10 cents	370
2325	Wavelengths of rotational lines in the water-vapor bands at 0.93 and 1.13 microns. C. C. Kiess.....5 cents	377
2326	Comparative strengths of four organic bases in benzene. Marion Maclean Davis and Hannah B. Hetzer.....10 cents	381
2327	The $3\nu_3$ bands of carbon disulfide and carbon dioxide. Norman M. Gailar and Earle K. Plyler.....5 cents	392
2328	On Cauchy-Riemann equations in higher dimensions. E. Stiefel.....5 cents	395

Vol. 48—June—No. 6

2329	Effect of strain-temperature history on the flow and fracture of ingot iron at low temperatures. Glenn W. Geil and Nesbit L. Carwile.....10 cents	399
2330	Gradient methods in the solution of systems of linear equations. Marvin L. Stein.....10 cents	407
2331	An alkaline solution of potassium chromate as a transmittancy standard in the ultraviolet. Geraldine W. Haupt.....10 cents	414
2332	Two applications of group characters to the solution of boundary-value problems. E. Stiefel.....5 cents	424
2333	Heterogeneous equilibria at the glass electrode-solution interface. Donald Hubbard and Richard G. Goldman.....10 cents	428
2334	Preparation of D-mannitol-C^{14} and its conversion to D-fructose-1-(and 6)-C^{14} by acetobacter suboxydans. Horace S. Isbell and J. V. Karabinos.....5 cents	438
2335	Analysis of goniophotometric reflection curves. Isadore Nimeroff.....10 cents	441
	Index to volume 48 (January to June 1952, Research Papers RP2279 to RP2335).....	449

U. S. GOVERNMENT PRINTING OFFICE: 1952